

**Subject: Cooling Minutes - Tuesday January 15th**

**Date:** Tue, 15 Jan 2002 16:07:46 -0800

**From:** Neal Hartman <nhartman@lbl.gov>

**Organization:** Lawrence Berkeley National Laboratory

**To:** Marco Olcese <olcese@ge.infn.it>, Vigeolas Eric <vigeolas@c ppm.in2p3.fr>, Tom Johnson <TAJohnson@lbl.gov>, Jon S Wirth <JSWirth@lbl.gov>, Fred Goozen <FRGoozen@lbl.gov>, Thomas F Weber <TFWeber@lbl.gov>, Murdock Gd Gilchriese <MGGilchriese@lbl.gov>, Eric C Anderssen <ECAnderssen@lbl.gov>

Hi All,

Here's some of the things we discussed in our relatively short meeting today:

1. Tom W. presented SEM results from the nasty discolored tubes. The pictures show a film over the entire viewable area, with a few noticeable "globs" of stuff (this is as compared to the picture of the clean tube). The areas away from the globs show just aluminum, like the clean sample, but within the globs peaks of S, Cl, and K show up (in that relative order of magnitude). Discussion with the plating shop indicates that no sulfur bearing baths are used during the UHV cleaning (just Nitric acid and a "deox" bath that is as yet undescribed), so there is no "normal" way that sulfur could have gotten onto the tubes. Sectioned samples of 2 foot long tubes show that the ends are clean, while the center sections show this "mucky" residue. It is possible that the residue comes from the extrusion process, and that the cleaning agent is simply unable to get into the center section of the small tube. Gentle agitation and a cleaner (like FC72 flouorocarbon) seem to clean the residue off easily. Currently the production process is:

Clean > Etch/Anneal > Bend > Clean out wax

We may need to add a cleaning step (possibly with UHV and FC72) between the etch/anneal stage and the bending. It generally seems agreed that cleaning after bending is unwise, as the tube is harder to push cleaner through and to rinse (although with FC72 this would not pose as much of a problem, as residue would not be harmful). I will discuss cleaning options with the plating shop so that we can decide how to move forward.

Tom is having the pictures and SEM plots scanned by Sherri so that I can load them onto my website for general distribution.

2. In plating will be attempted by Pat using vapor deposition. Tom W. has supplied a 50 micron foil for deposition of 25 microns of indium per side. A layer this thick may be unachievable with vapor deposition, so Tom will look into whether we have any onsite expertise in indium electroplating.

3. Tom J. showed three u-tubes which all look very nice. They are significantly stiffer than I had expected (though they were not annealed after bending). Tom is going to measure the spring rate between the two ends (in "phi") for the tubes before annealing. After annealing, he will measure the "set force" to produce a small (~1 mm) permanent displacement between the two ends. These measurements may not be overwhelmingly helpful, but they may give us a feel for the forces involved. He will also take some digital photos of the bent tubes for circulation.

4. Fred has no news on the delivery times for fittings or the indium washers. He will inform us as soon as he hears anything from the responsible shops.

Thanks alot!